

[Detailed Description of the Device]

[0001]

[Field of Industrial Utilization]

The present device relates to a panel unit mounting structure that is detachably mountable on the main body of an electronic device.

[0002]

[Prior Art]

Screw-mounted structures, such as the one shown in Figure 6, have been generally known in the past to be used for detachably mounting panel units provided with operating components such as switches and display units composed of liquid crystal display elements on the main body of an electronic device. Specifically, holes 13 through which screws 12 are passed penetrate through the four corners of a case 11 that constitutes a panel unit 1, and a mounting concavity 21 for the insertion and positioning of the panel unit 1 is provided to the panel surface of a device main body 2. Screw holes 22 into which the above-mentioned screws 12 are screwed are formed on the bottom surface of the mounting concavity 21. Consequently, when the panel unit 1 is mounted on the device main body 2, the panel unit 1 is inserted into and positioned in the mounting concavity 21 of the device main body 2, whereupon the screws 12 are inserted into the holes 13 in the case 11 and screwed into the screw holes 22 in the bottom surface of the mounting concavity 21, thereby fastening the panel unit 1 to the device main body 2.

[0003]

[Problems that the Device is to Solve]

Nevertheless, the above-mentioned conventional example is very hard to use because the mounting structure thereof requires the screws 12 to be inserted or removed whenever the panel unit 1 is attached or detached. Furthermore, the screws 12 may be scattered and lost when the panel unit 1 is detached, or come loose if not completely screwed in when the panel unit 1 is mounted. The present device, which has been created in order to resolve the drawbacks described in the foregoing, yields a panel unit mounting structure with which a panel unit may be readily attached to or detached from the panel surface of a device main body without necessitating a troublesome procedure.

[0004]

[Means for Solving the Problems]

The present device is a panel unit mounting structure that allows [the panel unit] to be detachably mounted to a panel unit mounting concavity provided to a panel surface of a device main body, wherein first and second engaging parts and engageable parts that [respectively] have concave and convex shapes and that engage with each other are respectively provided to either end of the above-mentioned panel unit and either inside surface of the above-mentioned mounting concavity that are mutually opposed, and from among the first and second engaging parts and engageable parts, the engaging part and engageable part on at least one [end] are constituted so that either this engaging part or engageable part can be moved in the engaging and disengaging directions and are constantly urged in the engaging direction.

[0005]

The above-mentioned first and second engaging parts formed on either end surface of the above-mentioned panel unit structured as described above are caused to engage with the above-mentioned first and second engageable parts provided to the mounting concavity of the above-mentioned device main body, thus enabling [the panel unit] to be mounted on the above-mentioned device main body. The resulting panel unit mounting structure enables panel units to be readily and securely attached to or detached from a device main body, in contrast to the procedure for attaching or detaching the screw-fixed panel unit as in a conventional example.

[0006]

[Embodiments]

The present device shall be described below by means of an embodiment thereof, with reference being made to Figures 1 through 5. Figures 1 (a) and 1 (b) depict perspective views of the panel unit mounting structure of the present device; Figures 2 (a) and 2 (b) depict plan and lateral views of a panel unit 3, with a case that constitutes the panel unit 3 being displayed in partial cross-section. A case 3a comprises upper and lower cases 32 and 33 that divide [the case 3a] into upper and lower sections in the horizontal direction. Recesses 32a and 33a that open on a surface on one end of [each of] the divided surfaces of the upper and lower cases 32 and 33 are disposed on those ends. Furthermore, a recess 37 that opens on a surface on the other end of the divided surface of the lower case 33 is disposed on [this] other end. When the upper and lower cases 32 and 33 are brought together, an engagement piece accommodating concavity 39 is configured by the recesses 32a and 33a, and an engaging concavity 38 is configured by the recess 37 and the divided surface of the upper case 32. An engagement piece 34 is accommodated in the engagement piece accommodating concavity 39 so that this engagement

piece is movable in the direction of length of the panel unit 3. The engagement piece 34 is retained by having both of its ends engage with projections 39a that project inward from both sides of the opening of the accommodating concavity 39. A compression spring 35 is arranged between the engagement piece 34 and the bottom surface of the accommodating concavity 39, and constantly urges the engagement piece 34 towards the opening side. The front surface 31 of the engagement piece 34 and one end of the case 3a at this time are substantially coplanar. A pair of engaging concavities 34a, 34a is formed in the front surface 31 of the engagement piece 34. Furthermore, a notch 33c cut into the space between the lower edge of the recess 33a and the lower surface of the lower case 33 is provided to one end surface of the lower case 33 so as to expose the underside of one end of the engagement piece 34 to the lower surface of the lower case 33. The spring 35 and engagement piece 34 may be readily integrated into the case 3a by separating the upper and lower cases 32 and 33, housing the engagement piece 34 and spring 35 in the recess 32a of one case 32, and then fitting the other case 33 thereto. Although this is not shown in the figures, the upper and lower cases 32 and 33 are provided with publicly known holding means for the purpose of holding the interlocked state of these cases. Furthermore, in the figures, 3b indicates a switch operating part, and 3c indicates a liquid crystal display element.

[0007]

Meanwhile, a mounting concavity 41 that is just large enough to be able to accommodate the panel unit 3 is disposed on the panel surface of a device main body 4 in the same manner as in the conventional example. A pair of engaging protuberances 44, 44 is provided to the inside surface on one end of the mounting concavity 41, in correspondence with the engaging concavities 34a in the panel unit 3. The upper surfaces of these protuberances 44 are formed as slanted surfaces. Moreover, an engaging protuberance 42 is provided to the inside surface on the other end of the mounting concavity 41, in correspondence with the engaging concavity 38 in the panel unit 3. In addition, a groove 43 that opens on the panel surface is formed between the engaging protuberances 44, 44 on the inside surface on one end of the mounting concavity 41. The width dimension of the groove 43 is set so as to allow a fingertip to be inserted therein, and the groove 43 has a slanted bottom surface that provides continuity between the upper surface of the device main body 4 and the bottom surface of the mounting concavity 41. Next, in order to mount the panel unit 3 within the mounting concavity 41 of the device main body 4 that is configured as described above, the end side of the panel unit 3 to which the engaging concavity 38 is provided is inserted into the mounting concavity 41 of the device main body 4, and the engaging concavity 38 is made to engage with the engaging protuberance 42 on the side of the device main body 4, as shown in Figure 3. The panel unit 3 is subsequently pivoted

towards the mounting concavity 41 of the device main body 4, with the engaging portion between the engaging concavity 38 of the panel unit 3 and the engaging protuberance 42 being used as the pivoting center. Consequently, the lower end on the side of the front surface (i.e., on one end side) of the engagement piece 34 of the panel unit 3 comes into contact with the slanted surfaces of the engaging protuberances 44 provided to the mounting concavity 41, as shown in Figure 4 (a).

[0008]

When pressure is applied to the panel unit 3 in this state, the engagement piece 34 receives a reaction force from the engaging protuberances 44, and thereby slides inward against the elasticity of the spring 35, as shown in Figure 4 (b). Once the engaging concavities 34a of the engagement piece 34 and the engaging protuberances 44 on the side of the device main body 4 are in alignment as a result of the panel unit 3 being further pressed into the mounting concavity 41, the engagement piece 34 returns to its original position by the returning force of the spring 35, causing the engaging concavities 34a and engaging protuberances 44 to interlock, as shown in Figure 4 (c). Consequently, the engaging concavity 38 on one end of the panel unit 3 engages with the engaging protuberance 42 of the device main body 4, and the engaging concavities 34a of the engagement piece 34 on the other end side engages with the engaging protuberances 44 of the device main body 4 (see Figure 5), thus securely mounting the panel unit 3 inside the mounting concavity 41 of the device main body 4. Next, in order to release this locked state and to remove the panel unit 3 from the mounting concavity 41 of the device main body 4, one inserts a finger into the groove 43 of the device main body 4, and presses the engagement piece 34 inward against the elastic force of the spring 35, thereby disengaging the engaging concavities 34a of the engagement piece 34 from the engaging protuberances 44 of the device main body 4. The panel unit 3 is subsequently pivoted upward about the engaging portion between the engaging concavity 38 and engaging protuberance 42, and is then removed from the mounting concavity 41 of the device main body 4 by disengaging the engaging concavity 38 from the engaging protuberance 42. In the above-mentioned embodiment, furthermore, a coil spring is used as the spring 35 for urging the engagement piece 34. However, the spring is not limited to this option, and a leaf spring, for example, may also be used. It is also possible to consider mounting magnets on the engagement piece 34 and on the mutually opposed inside wall surfaces of the [upper and lower] cases 32 and 33, and utilizing the repelling force of the magnets. Moreover, in the embodiment, the engaging concavities 34a and 38 are provided to the side of the panel unit 3, and the engaging protuberances 42 and 44 that engage with the engaging concavities 34a and 38 are formed on the side of the device main body 4; however, it is

certainly possible to provide engaging protuberances to the side of the panel unit 3, and form engaging concavities on the device main body side.

[0009]

[Effect of the Device]

As has been described in the foregoing, the panel unit of the present device has an engaging concavity formed in the surface on one end side thereof, and an engagement piece that is provided with engaging concavities is assembled in the surface on the other end side [of this panel unit] while allowing this engagement piece to be pushed inward in a state in which this engagement piece is urged in a recoiling manner on [this] other end side. As a result, the engaging concavity on one end of the panel unit is caused to engage with the engaging protuberance formed on one [end] of the inside wall surfaces of the mounting concavity in the device main body, and the engaging concavities of the engagement piece are caused to elastically engage with the engaging protuberances on the other [end of the] inside wall surfaces of the device main body, thus allowing the panel unit to be mounted to the device main body. Consequently, the panel unit can be readily attached to and detached from the device main body, in contrast to the procedure for attaching or detaching the panel unit by means of screws as in conventional examples. Furthermore, the recoiling force of the engagement piece acts on the portion where the panel unit and device main body are engaged, which results in a panel unit mounting structure that allows the panel unit to be mounted to the device main body with increased reliability.

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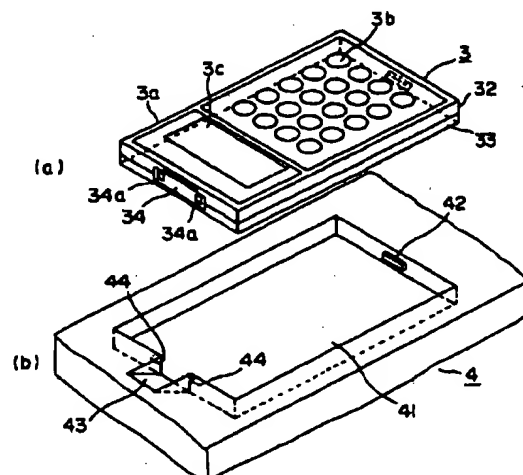
航空電子工業株式会社内

(54)【考案の名称】 パネルユニット取付構造

(57)【要約】

【目的】 面倒な操作を必要とせず、機器本体に対しパネルユニットを容易に着脱できるパネルユニット取付構造を提供する。

【構成】 機器本体4のパネル面に設けたパネルユニット取付凹部41に着脱自在に取り付けられるパネルユニット取付構造において、パネルユニット3の両端面及びこれと対向する取付凹部41の両内側面には互いに係合する凸凹状の第1及び第2の係合部34a、37及び被係合部42、44をそれぞれ設け、該第1及び第2の係合部34a、37及び被係合部42、44のうち少なくとも一方の係合部34a及び被係合部44は、該係合部34a及び被係合部44の一方が係合、係合離脱方向に移動可能でかつ常時係合する向きに付勢するよう構成されていることを特徴とする。



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【実用新案登録請求の範囲】

【請求項1】 機器本体のパネル面に設けたパネルユニット取付凹部に着脱自在に取り付けられるパネルユニット取付構造において、上記パネルユニットの対向する両端面及びこれと対向する上記取付凹部の両内側面には互いに係合する凸凹状の第1及び第2の係合部及び被係合部をそれぞれ設け、該第1及び第2の係合部及び被係合部のうち少なくとも一方の係合部及び被係合部は、該係合部及び被係合部の一方が係合、係合離脱方向に移動可能でかつ常時係合する向きに付勢するよう構成されていることを特徴とするパネルユニット取付構造。

【図面の簡単な説明】

【図1】(a)は本考案の実施例に係るパネルユニットの斜視図、(b)は機器本体の斜視図

【図2】(a)、(b)はパネルユニットの一部を断面にした平面図及び側面図

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*【図3】本考案のパネルユニット取付構造を示す説明図

【図4】(a)、(b)及び(c)は、この考案の機器本体に対するパネルユニットの一端側の取付過程を示す断面図

【図5】(a)、(b)及び(c)は、この考案の機器本体に対するパネルユニットの他端側の取付過程を示す断面図

【図6】従来例を示す分解斜視図

【符号の説明】

3 パネルユニット

34 係止片

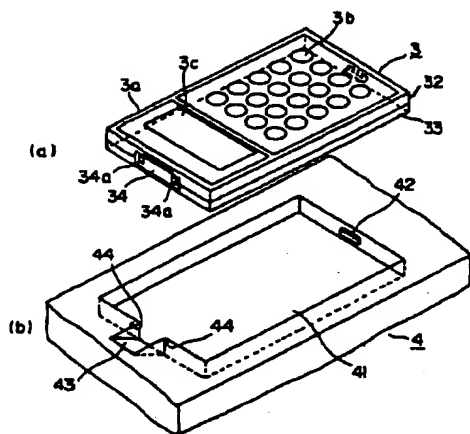
34a、37 係合凹部

4 機器本体

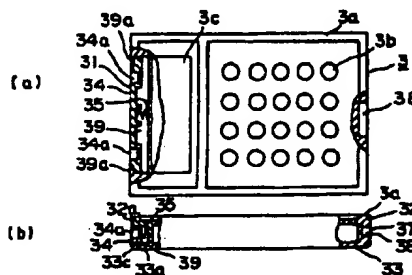
41 取付凹部

42、44 係合凸起

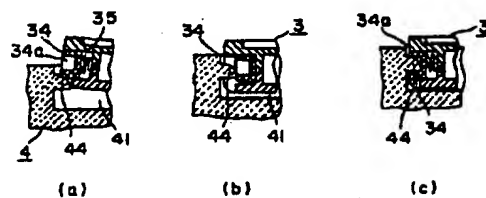
【図1】



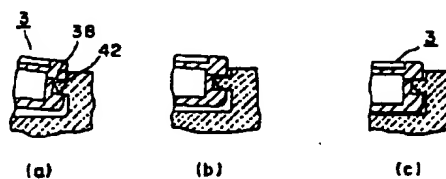
【図2】



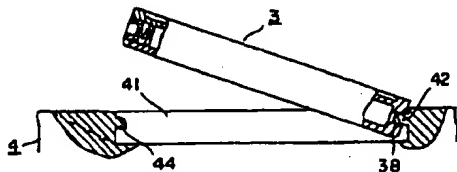
【図4】



【図5】



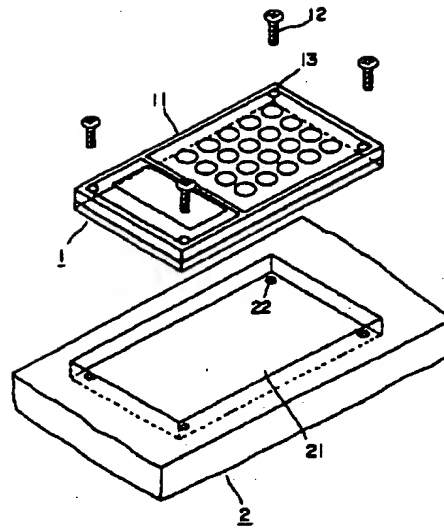
【図3】



(3)

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【図6】



【考案の詳細な説明】

【0001】

【産業上の利用分野】

本考案は、電子機器本体に着脱自在に取り付けられるパネルユニットの取付構造に関するものである。

【0002】

【従来技術】

従来、液晶表示素子等の表示器やスイッチ等の操作部を備えたパネルユニットを電子機器本体に着脱自在に取り付けるには、図6に示す如くネジによる取付構造が一般的に知られている。即ち、パネルユニット1を構成するケース11の四隅にはネジ12を通すための孔13が貫設され、又、機器本体2のパネル面にはパネルユニット1を挿入して位置決めする取付凹部21を設けている。その取付凹部21の底面には、上記ネジ12と螺合するネジ孔22が形成されている。この為、機器本体2にパネルユニット1を取り付ける際は、機器本体2の取付凹部21内にパネルユニット1を挿入して位置させた後、ネジ12がケース11の孔13に挿入され、取付凹部21の底面のネジ孔22に螺合されることによって、パネルユニット1を機器本体2に固定する。

【0003】

【考案が解決しようとする課題】

しかしながら、上記従来例の取付構造ではパネルユニット1の着脱操作の際、その都度、ネジ12を取り付けたり、或は取り外しを行なわねばならず甚だ作業性が悪かった。しかも、パネルユニット1を取り外した際には、ネジ12を散逸することもあり得る。又、パネルユニット1の取付時にネジ12の締付けが不完全だと、ネジ12が緩む恐れもあった。本考案は上述したような欠点を解決する為に成されたものであって、面倒な操作を必要とせず、機器本体のパネル面に対しパネルユニットを容易に着脱できるパネルユニット取付構造が得られる。

【0004】

【課題を解決する為の手段】

本考案は、機器本体のパネル面に設けたパネルユニット取付凹部に着脱自在に

取り付けられるパネルユニット取付構造において、上記パネルユニットの両端及びこれと対向する上記取付凹部の両内側面には互いに係合する凸凹状の第1及び第2の係合部及び被係合部をそれぞれ設け、該第1及び第2の係合部及び被係合部のうち少なくとも一方の係合部及び被係合部は、該係合部及び被係合部の一方が係合、係合離脱方向に移動可能で、かつ常時係合する向きに付勢するものである。

【0005】

以上の如く構成された上記パネルユニットは、両端面に形成した上記第1及び第2の係合部を上記機器本体の取付凹部に設けた上記第1及び第2の被係合部に係合させることにより、上記機器本体に取り付けることができる。この為、従来例の様なネジによるパネルユニットの着脱操作に比べ、機器本体に対し容易に、且つ、確実にパネルユニットを着脱できるパネルユニット取付構造が得られる。

【0006】

【実施例】

以下、本考案の実施例について図1乃至図5を参照しつつ説明する。図1(a)、(b)は本考案のパネルユニット取付構造を示す斜視図であり、図2(a)、(b)はパネルユニット3の平面図及び側面図であって、パネルユニット3を構成するケースを一部断面にして示したものである。ケース3aは水平方向で上下に2分割された上、下ケース32、33から成る。上、下ケース32、33の分割面の一端側には一端面側に開口する凹所32a、33aを有する。又、下ケース33の分割面他端側には他端面側に開口する凹所37を有する。上、下ケース32、33を組み合わせると凹所32a、33aによって係合片収納凹部39、凹所37と上ケース32の分割面とによって係合凹部38が構成される。係合片収納凹部39には係合片34がパネルユニット3の長手方向に移動可能に収納されている。係合片34はその両端が収納凹部39開口の両側から内側に突出する突出部39aに係合することによって抜け止めされている。係合片34と収納凹部39底面との間には圧縮バネ35が配置され、係合片34を常時開口側に付勢している。このときの係合片34の前面31とケース3aの一端は略同一面とされている。係合片34の前面31には一对の係合凹部34a、34aが形成

されている。又、下ケース33の一端面には、凹所33aの下縁と下ケース33の下面との間を切り欠いた切り欠き33cが設けられ係合片34の一端側下端が下ケース33の下面に露出するようにしている。ケース3aへの係合片34及びバネ35の組み込みは、上、下ケース32、33を分離した状態にして、一方のケース32の凹所32aに係合片34及びバネ35を収納し、他方のケース33を組み合わせるにより簡単に行なうことができる。なお、図示していないが、上、下ケース32、33には互いの組み合せ状態を保持するため公知の保持手段が設けられている。なお、図中3bはスイッチ操作部、3cは液晶表示素子を示す。

【0007】

一方、機器本体4のパネル面には、従来例と同様パネルユニット3を丁度収納できる大きさの取付凹部41を有する。取付凹部41の一端側内側面にはパネルユニット3の係合凹部34aに対応して一对の係合凸起44、44が設けられている。その係合凸起44の上面は傾斜面としてある。又、取付凹部41の他側内側面にはパネルユニット3の係合凹部38に対応して係合凸起42が設けられている。更に、取付凹部41の一端側内側面の係合凸起44、44間にはパネル面に開口する溝43を形成している。溝43の幅寸法は指先が挿入し得るように設定されており、又、溝43の底面は機器本体4の上面から取付凹部41の底面に連続する傾斜面になっている。次に、上記の如く構成された機器本体4の取付凹部41内にパネルユニット3を取り付けるには、パネルユニット3の係合凹部38が設けられた端側を機器本体4の取付凹部41内に挿入し、図3に示す如く係合凹部38を機器本体4側の係合凸起42に係合する。次いで、パネルユニット3は係合凹部38と係合凸起42との係合部分を中心にして機器本体4の取付凹部41側に回動される。この為、図4(a)に示す様に、パネルユニット3の係合片34の前面側(一端側)下端が取付凹部41に突設した係合凸起44の斜面に当接する。

【0008】

この状態からパネルユニット3を押圧すると、図4(b)の如く、係合片34は係合凸起44からの反力を受けることにより、バネ35の弾性力に抗して内方

へ摺動する。更に、パネルユニット3を取付凹部41内に押し込み、係合片34の係合凹部34aと機器本体4側の係合凸起44との位置が合うと、図4(c)に示すようにバネ35の復帰力によって係合片34が元の位置に戻り、係合凹部34aと係合凸起44とが係合し合う。この為、パネルユニット3は一端側の係合凹部38が機器本体4の係合凸起42に係合し、他端側の係合片34の係合凹部34aが機器本体4の係合凸起44に係合することにより(図5参照)、機器本体4の取付凹部41内に確実に取り付けられる。次に、この係合状態を解除して機器本体4の取付凹部41からパネルユニット3を取り外すには、機器本体4の溝43に手指を挿入し、係合片34をバネ35の弾力に抗して内方へ押し込むことによって、係合片34の係合凹部34aと機器本体4の係合凸起44との係合を外す。その後、パネルユニット3は係合凹部38と係合凸起42との係合部分を中心にして上方へ回動され、次いで、係合凹部38と係合凸起42との係合を外すことによって機器本体4の取付凹部41から取り出される。尚、上記実施例では、係合片34を付勢するバネ35にコイルバネを用いているが、これに限定されず、例えば板バネを使用してもよい。更には、係合片34とケース32、33の内壁面の互いに対向する面に磁石を取り付け、その磁石の反発力を利用することも考えられる。また、実施例ではパネルユニット3側に係合凹部34a、38を設け、機器本体4側に係合凹部34a、38と係合する係合凸起42、44を形成したが、パネルユニット3側に係合凸起を設け、機器本体側に係合凹部を形成するようにしてもよいことは勿論である。

【0009】

【考案の効果】

以上説明したように、本考案のパネルユニットは一端側端面に係合凹部を形成し、他端側端面には係合凹部を設けた係合片が他端側に弾発付勢された状態で押込自在に組み込まれている。これにより、パネルユニットは一端側の係合凹部を機器本体取付凹部の一方の内壁面に形成された係合凸起に係合させると共に、係合片の係合凹部を機器本体の他方の内壁面の係合凸起に弾性的に係合させることにより機器本体に取り付けられる。この為、従来例の様なネジによるパネルユニットの着脱操作に比べ、機器本体に対し容易にパネルユニットを着脱できる。

しかも、係合片の弾発力がパネルユニットと機器本体との係合部分に作用するため、パネルユニットを機器本体に信頼性を増して取り付けられるパネルユニット取付構造が得られる。

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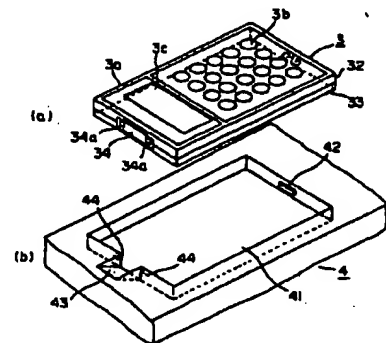
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(54) [Title of the Device] **PANEL UNIT MOUNTING STRUCTURE**

(57) [Abstract]

[Object] [The object of the present device is] to provide a panel unit mounting structure with which a panel unit can be readily attached to or detached from the main body of a device without necessitating a troublesome procedure.

[Constitution] A panel unit mounting structure that allows [the panel unit] to be detachably mounted to a panel unit mounting concavity 41 provided to a panel surface of a device main body 4, characterized in that first and second engaging parts 34a and 37 and engageable parts 42 and 44 that [respectively] have concave and convex shapes and that engage with each other are respectively provided to either end surface of a panel unit 3 and either inside surface of the mounting concavity 41 that are mutually opposed, and from among the first and second engaging parts 34a and 37 and engageable parts 42 and 44, at least engaging parts 34a and engageable parts 44 [located] on one [end] are constituted so that either these engaging parts 34a or engageable parts 44 can be moved in the engaging and disengaging directions and are constantly urged in the engaging direction.



[Claims]

[Claim 1] A panel unit mounting structure that allows [the panel unit] to be detachably mounted to a panel unit mounting concavity provided to a panel surface of a device main body, this panel unit mounting structure being characterized in that first and second engaging parts and engageable parts that [respectively] have concave and convex shapes and that engage with each other are respectively provided to either opposite end surface of the above-mentioned panel unit and either inside surface of the above-mentioned mounting concavity that are mutually opposed, and from among the first and second engaging parts and engageable parts, the engaging part and engageable part on at least one [end] are constituted so that either this engaging part or engageable part can be moved in the engaging and disengaging directions and are constantly urged in the engaging direction.

[Brief Description of the Drawings]

[Figure 1] Figure 1 (a) is a perspective view of the panel unit according to an embodiment of the present device, and Figure 1 (b) is a perspective view of the main body of the device.

[Figure 2] Figures 2 (a) and 2 (b) are partial cross-sections of the panel unit in plan view and lateral view.

[Figure 3] Figure 3 is an explanatory diagram showing the panel unit mounting structure of the present device.

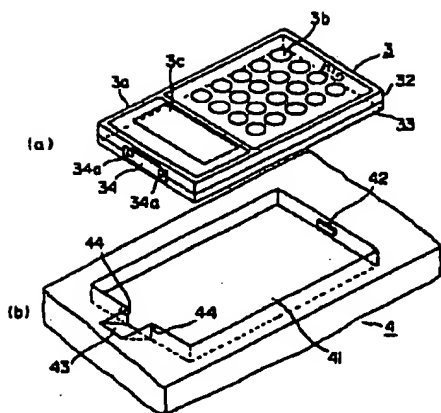
[Figure 4] Figures 4 (a), 4 (b) and 4 (c) are cross-sectional views depicting the procedure whereby one end of the panel unit is mounted on the main body of the present device.

[Figure 5] Figure 5 (a), 5 (b) and 5 (c) are cross-sectional views depicting the procedure whereby the other end of the panel unit is mounted on the main body of the present device.

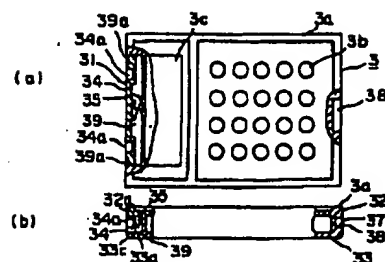
[Figure 6] Figure 6 is an exploded perspective view showing a conventional example.

[Explanation of Symbols]

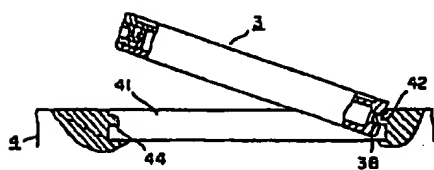
- 3: Panel unit
- 34: Engagement piece
- 34a, 37: Engaging concavities
- 4: Device main body
- 41: Mounting concavity
- 42, 44: Engaging protuberances



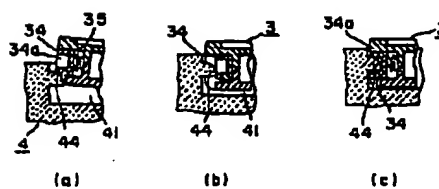
[Figure 1]



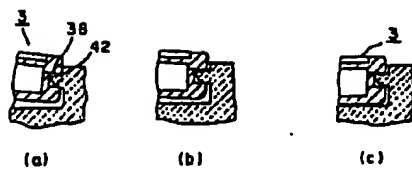
[Figure 2]



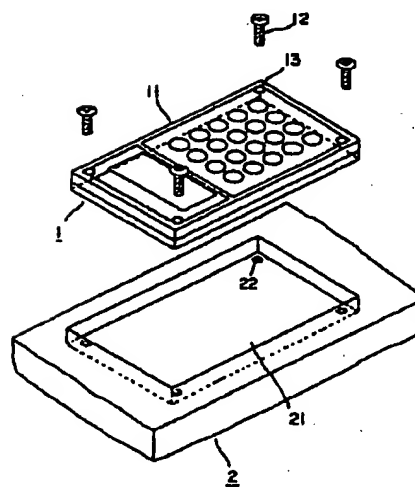
[Figure 3]



[Figure 4]



[Figure 5]



[Figure 6]